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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/593,891	06/14/2000	Sadao Nakayama	NFC DP-624	8215

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EXAMINER

CHU, CHRIS C

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 03/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/593,891

Applicant(s)

NAKAYAMA, SADA O

Examiner

Chris C. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on August 8, 2002 has been received and entered in the case.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 ~ 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Warren in view of Bruce et al. and further in view of Rostoker.

Regarding claim 1, Warren discloses in the figure a stacked semiconductor storage device comprising, in combination,

- a lower chip (12) and an upper chip (22) superimposed on a substrate (11),
- said semiconductor storage device further comprising:

- a wiring substrate (14), interposed between said lower chip and said upper chip, for relaying electric connection between bonding pads on said upper chip (22) and bonding pads (17) on said substrate.
- wherein the bonding pads on said upper chip (22) are arranged in a line running perpendicular to a line of bonding pads (17 in right or left side) on the substrate (14);
- wherein said upper chip (22) having an upper and a lower surface, said lower surface facing said substrate.

Warren does not disclose wiring patterns. However, Bruce et al. discloses in Figs. 5 ~ 7 wiring patterns (58). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Warren by using the wiring patterns and the bonding pads on the upper chip being arranged in a line running perpendicular to a line of bonding pads on the substrate as taught by Bruce et al. The ordinary artisan would have been motivated to modify Warren in the manner described above for at least the purpose of providing same impedance between the bond pads of the secondary support structure and the primary die (column 2, lines 51 ~ 53).

Further, Warren does not disclose the bonding pads on said upper chip that connect to the bonding pads of said substrate being disposed on the lower surface of said upper chip. However, Rostoker teaches in Fig. 1a bonding pads (108) on a chip that connect to the bonding pads of a substrate (110) being disposed on the lower surface of the chip. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to further modify Warren by using the bonding pads on said upper chip that connect to the bonding pads of said substrate being disposed on the lower surface of said upper chip as taught by Rostoker. The

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ordinary artisan would have been motivated to further modify Warren in the manner described above for at least the purpose of increasing I/O connections (column 5, lines 7 ~ 17).

Regarding claim 2, Warren, as modified, where he/she shows a first terminal (around 22) connected to a terminal (on top of 22) on a surface of the upper chip (22 and see the Figure), a second terminal (17) connected to a terminal (11a) on a surface of the substrate (11), and a wiring pattern (column 3, lines 20 ~ 34) for connecting the first and the second terminals on the surface of the wiring substrate (14).

Regarding claim 3, Warren, as modified, where he/she shows a semiconductor storage device further comprising: a first bonding wire (see the figure) for connecting the terminal of the surface of the upper chip with the first terminal; and a second bonding wire (20) for connecting the terminal (11a) of the surface of the substrate (11) with the second terminal (17).

Regarding claim 4, Warren, as modified, discloses a wiring pattern whose one end is connected to a terminal on a rear surface of the upper chip, and whose other terminal is connected to a terminal on a surface of the lower chip.

Regarding claims 5 and 6, Warren, as modified, where he/she shows said terminal (13) of the surface of said lower chip (12) is connected to said terminal (11a) of the surface of said substrate (11a) by a third bonding wire (see the figure).

Regarding claims 7 and 8, Warren, as modified, where he/she shows said wiring substrate is sheet or board (see the figure) wiring substrate (14).

Response to Arguments

4. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Chris C. Chu
Examiner
Art Unit 2815

c.c.
February 12, 2003



EDDIE LEE
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